DIGITAL RESEARCH COMPUTERS
P.O.BOX 401565
GARLAND, TEXAS 75040

FEATURES:

FULLY SS-50C (SWTPC 6800/6809) BUSS COMPATIBLE

USES THE RELIABLE LOW POWER 2114 4K STATIC RAM CHIP

1 OR 2 MHZ VERSIONS AVAILABLE

PC BOARD IS SOLDER MASKED AND SILK SCREENED

ALL DATA AND ADDRESS LINES FULLY BUFFERED

LOW POWER: 2 AMPS TYPICAL

KIT INCLUDES ALL PARTS, SOCKETS, AND CONNECTORS

SIMPLE AND STRAIGHT-FORWARD DESIGN FOR RELIABILITY

IMPROVED HEAT DISSAPATION ON ALL REGULATORS

BOARD IS LIBERALLY BYPASSED WITH DISCS AND TANTALUMS

SUPPORTS EXTENDED ADDRESSING (UPTO 1 MEGABYTE)

A BOARD YOU WILL BE PROUD TO HAVE IN YOUR SYSTEM

BLANK PC BOARD (WITH DATA) AVAILABLE

PARTS LIST

2	14 Pin IC Sockets
2	16 Pin IC Sockets
64	18 Pin IC Sockets
1	20 Pin IC Sockets
2	24 Pin IC Sockets
5	10 Pin Molex Sockets
4	(Pairs) Heatsinks with hardware
36	Disc Bypass Caps (.01 Mfd. Typ. Value not critical.)
8	Tantalum Caps. (1.0 Mfd >15VDC. Value not critical.)
4	7805 5VDC Regulators
64	2114L 1K x 4 Static RAMs (Must be LOW POWER)
1	74LS367 Buffer (8T97,8097, or 74367)
1	74LS368 (8T98,8098, or 74368)
2	74LS154 (74154)
2	74LS266 (8242)
1	74LS245 Octal Tranceiver (8T245 or sub 74LS640)
1	DIP Switch
1	8 Pin SIP resistor pack (2.2k to 5.6K) Pin 1 common. Example: Beckman 784-1-R4.7K.
1	PC Board

GENERAL CONSTRUCTION HINTS

For soldering we recommend a 32 Watt soldering penci. DO NOT use a soldering gun! Use small diameter (such as 24 gauge) rosin core 60/40 alloy solder.

Keep the soldering pencil tip clean with a wet sponge or cloth.

After the capacitors have been soldered in place, use a small pair of diagonal cutters to remove the excess lead length.

Observe the polarities of all tantalum capacitors.

90 Day LIMITED WARRANTY

A copy of our limited warranty is enclosed with this kit. We urge you to read it and retain it for future reference. This document is printed on yellow paper so that it will be easily located.

STATIC ELECTRICITY

Static electricity can KILL MOS !!! Work at a grounded work station. A good rule of thumb is that a spark YOU can feel can certainly zap a MOS device. Assembled RAM boards should be wrapped in foil before shipping. Use only a grounded soldering instrument.

ASSEMBLY INSTRUCTIONS

☐ Give the PC board a good visual inspection for any obvious opens or shorts. There should be none, but a few minutes spent here could save many hours later.

☐ Using an ohm meter, insure that there are no shorts between the +8 volt buss and ground.

☐ Install and solder 64 18 pin sockets in IC locations X1 through X64. Note that there is a notch or indentation on each of the IC sockets. This notch should be oriented in the same direction as the dot on the PC board. (i.e. The notch points AWAY from the molex connectors)

☐ Install and solder two 16 pin sockets at U9, U10.

☐ Install and solder two 14 pin sockets at U5, U7.

☐ Install and solder one 20 pin socket at U12.

☐ Install and solder two 24 pin sockets at U8, U11.

☐ Install and solder the 8 pin SIP resistor pack at U6.

Note that pin #1 of the SIP is denoted by a dot.

[] Install and solder a 8 position DIP switch at S1.

[] Install and solder the disc caps in locations C9-C44.

[] Install and solder the tantalum caps in locations C1-C8. The + on the PC board denotes the positive lead of this electrolytic style of cap. A tantalum installed backwards may burn, explode, or short.

[] Using ONLY the bottom half (THM6070) of the heatsink pair, along with the hardware supplied, install and solder the four 7805 voltage regulators. The top half of the heatsink (THM6071) will be added later.

[] Install and solder the 5 Molex sockets into the holes at the bottom of the PC board. It is recommended that a pin on each socket is first soldered. Then go back and align each socket as needed to insure proper mating with the pins on the motherboard.

[] Install the enclosed indexing pin into the appropriate socket hole. (This is the missing pin on the motherboard.) The purpose of this index pin is to prevent the PC board from being inserted incorrectly into the motherboard.

[] Insert the PC board (less ICs) into the motherboard. Using a volt meter, measure the output of each 7805. The regulated output is measured between ground (the screw) and the rightmost pin of the regulator. The measured output voltage should be between 4.75 and 5.25 VDC. Any regulator not within these limits is bad and must be replaced.

[] Go back and unscrew the hardware on the 4 voltage regulators. Carefully remove the heatsink bottoms. Install eight 2114L RAMs in locations X57-X64. Starting with U4, carefully slide heatsink bottom under the 7805 regulator. Align the screw hole on the regulators, heatsinks, and PC board. Put the screw through the heatsink top (THM6071) and carefully insert the screw through the aligned holes. Attach the nut from the bottom and tighten. You should now have a two piece heatsink that sandwiches the voltage regulator metal tab. Repeat this procedure at locations U3, 2, 1.

[] Now go back and recheck the voltage regulators for proper operation.

[] Insert a 74LS367 in location U10. Be sure you match pin #1 of the IC with the notch on the socket. Pin #1 of the IC is denoted by a small notch, dot, or indentation.

[] Insert a 74LS368 in location U9.

[] Insert two 74LS266 in locations U5, and U7.

[] Insert two 74LS154 in locations U8, and U11.

[] Insert a 74LS245 in location U12.

[] Insert the remaining 56 2114L RAMs in locations X1-X56. Note that all Pin #1s are UP.

[] Recheck the installed ICs for any evidence of a bent under pin.

[] Recheck the 7805 regulators for the final time.

RAM BOARD SETUP AND USE

The board's address is selected by the dip switch. Switch position A15 determines which of the two possible 32K blocks that this board will reside in. Switch A15 being ON selects the lower 32K block (the most common use). Switch A15 OFF (open) selects the upper 32K block. Addressing for the UPPER 32K block is normally reserved for extended addressing mainframes.

The switch position EXT. enables the extended address lines S0-S3. Although not used in older (6800) systems, they are enjoying increasing popularity in newer (6809) mainframes. If you do not need extended addressing it can be disabled by switching OFF the EXT position. Switching EXT on ,connects the extended addressing decoder to the board decode logic.

By using extended addressing lines S0-S3 and A15, this board may reside in any 32K block within the available 1 Megabyte address space. CAUTION: Because older machines used these same lines to transmit the Baud rates to the I/O boards, insure that YOUR machine supports extended addressing before it is enabled.

In systems which do not use the extended addressing scheme, this board may only reside in the LOWER 32K block. Thus, in most older systems this board would be addresed at the lower 32K, and your older 8K or 16K boards would be addressed ABOVE this board. In other words, this 32K board is not designed to be partially populated in order to leave room for system ROM.

THEORY OF OPERATION

Power is supplied to the board via the +8 VDC unregulated buss. The +8 VDC is decoupled by several tantalum caps and regulated to +5 VDC by four 7805 regulators.

Address selection and buss control are performed by U7. Extended addressing is decoded by U5. Pairs of 2114 are selected by U8 and 11. Since the 2114 is organized as 1K x 4, it takes two devices to make an 8 bit word. All low nibbles (4 bits) are stored in odd numbered 2114s. All upper nibbles are in even numbered 2114s.

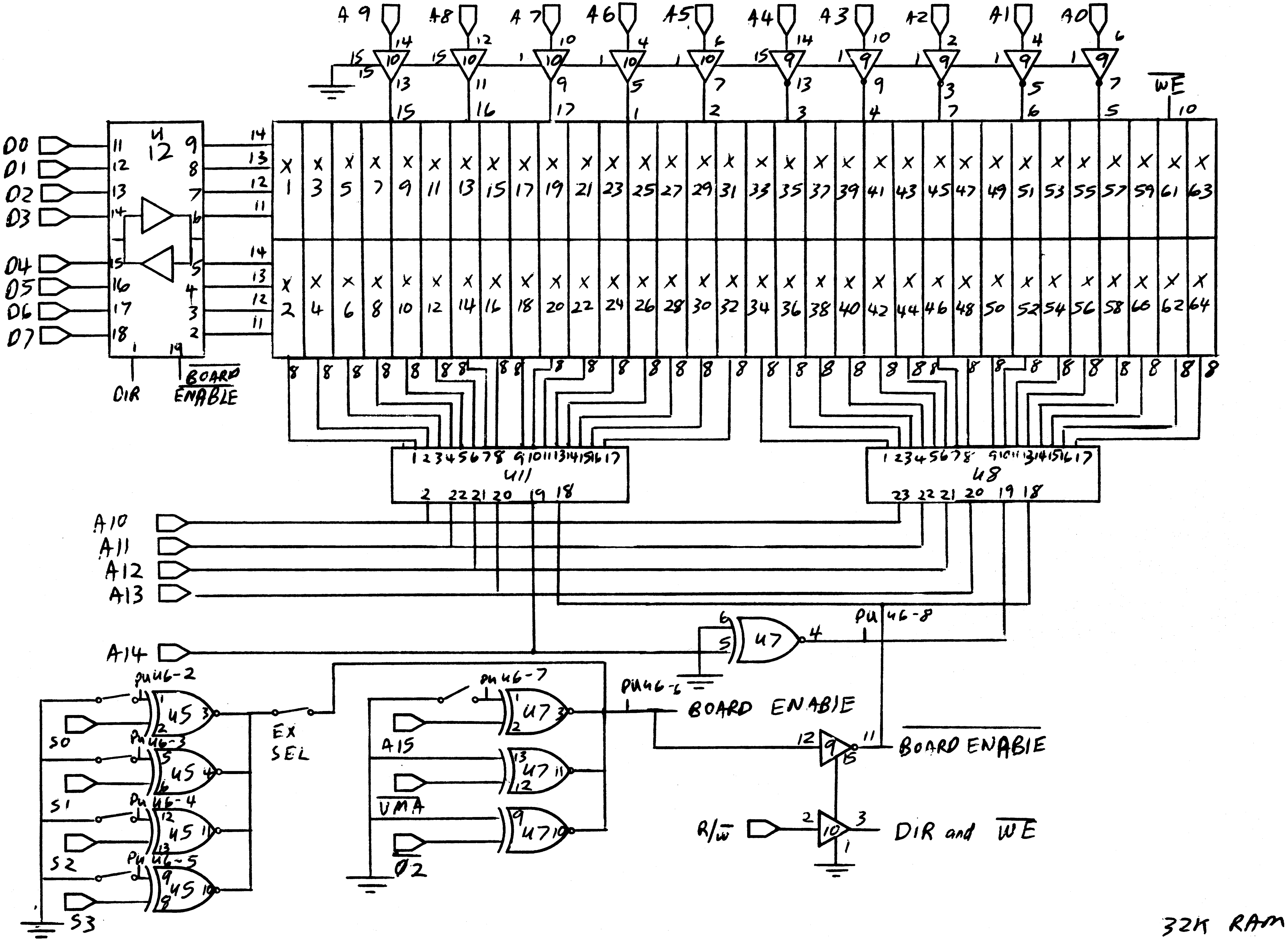
The low order adresses are buffered by U9 and 10, while U12 buffers the data to and from the RAM board. A memory read is a combination of a LOW VMA, a HIGH R/W, a LOW phase 2 clock, and the selected address of the board matching the addresses on the buss. A memory write contains the same signals, except that R/W is LOW.

MEMORY ARRAY ORGANIATION

The memory array consists of 64 2114L RAM chips (1Kx4), these are organized as 32 pairs, yielding a 32K by 8 bit memory board. As discussed earlier, the lower 4 bits are stored in odd numbered RAMs starting with X1 and ending with X63. The upper 4 bits are stored in the even numbered devices. The first pair (first 1K RAM) X1-X2 are in the upper right hand corner of the board. The second pair X3-X4 are in the lower right hand corner. The third pair X5-X6 are one column to the left of the pair X1-X2. The fourth pair X7-X8 are below pair X5-X6. The last pair X63-X64 (32nd K of RAM) is located in the lower left hand corner of the board under the heatsinks.

MEMORY RELIABILITY

After completion, test your memory board as much as possible. Use any and all memory diagnostics at your disposal. The vast majority of system problems are simply memory problems. Our experience has taught us that ANY solid state device can act ANY way it wants to at ANY time it wants to. Retest you memory often. Just because your memory was passing diagnostics LAST week does not mean it will pass THIS week.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U12
DIR
BOARD ENABLE
U11
U8
A10
A11
A12
A13
A14
U7
PU U6-8
PU U6-2
PU U6-3
PU U6-4
PU U6-5
PU U6-7
PU U6-6
U5
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S1
S2
S3
EX SEL
A15
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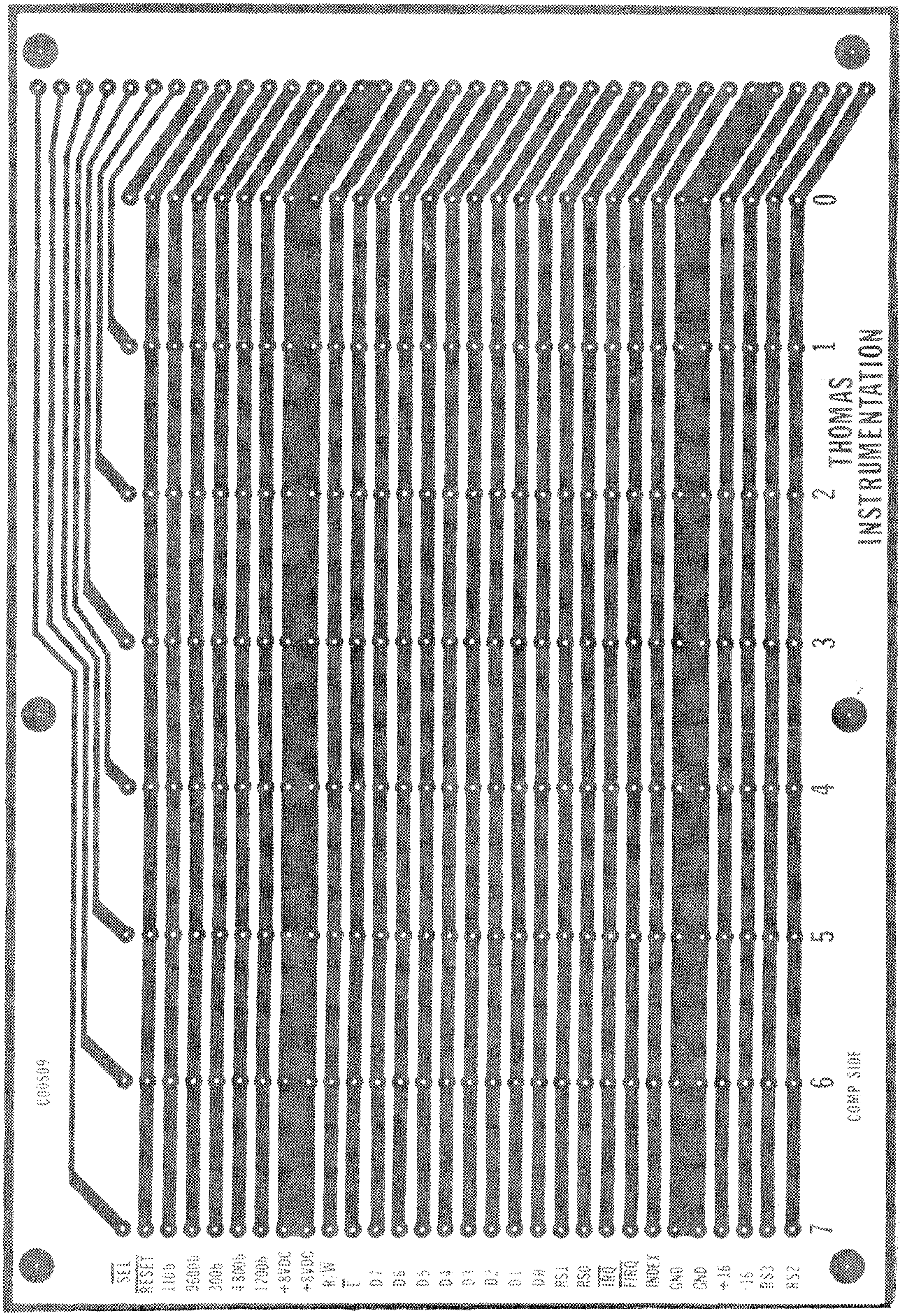
BOARD ENABLE
BOARD ENABLE
R/W
DIR and WE

32K RAM
SS-50

THOMAS INSTRUMENTATION IS NOW SELLING EIGHT POSITION BACKPLANES. THE NINTH POSITION HAS **THIRTY** SEVEN PINS WITH EIGHT SELECT LINES. THE NINTH POSITION CAN BE USED WITH OUR TRANSITION BOARD TO INTERFACE WITH ANY SS-50 or 50C BACKPLANE FOR 6800 or 6809 USE. BARE BACKPLANE $39.00 THREE (3) CONNECTORS ARE REQUIRED FOR EACH POSITION.

*TIN .40¢each
*GOLD $1.60each



THOMAS INSTRUMENTATION IS NOW SELLING 16 POSITION SS-50 BACKPLANES. WE CUT THE 16 POSITION BACKPLANE AND MAKE 12, 8 and 4 POSITIONS. THE DIAGRAM BELOW IS AN 8 POSITION BACKPLANE. FIVE (5) CONNECTORS ARE REQUIRED FOR EACH POSITION.

*16 POSITION $80.00 *8 POSITION $40.00

*12 POSITION $60.00 *4 POSITION $20.00 *TIN .40¢ea. *GOLD $1.60ea.